

What is claimed is:

1. An antenna, comprising:
 - a ground plane having a first planar surface and a first area;
 - a radiating element having a second planar surface and a second area,
 - wherein the second planar surface of said radiating element is substantially coplanar with the first planar surface of said ground plane;
 - a first connecting line coupled to a first edge of said ground plane and to a second edge of said radiating element at a first contact location; and
 - a second connecting line coupled to the second edge of said radiating element at second and third contact locations.
2. The antenna according to claim 1, wherein the first area of said ground plane is greater than the second area of said radiating element.
3. The antenna according to claim 1, wherein the first area of said ground plane area is substantially the same as the second area of said radiating element.
4. The antenna according to claim 1, wherein the first contact location is between the second and third contact locations.
5. The antenna according to claim 1, further comprising the second connecting line being coupled to the second edge of said radiating element at a plurality of contact locations.

1 6. The antenna according to claim 1, wherein the first and second connecting
2 lines are adapted for a desired impedance.

1 7. The antenna according to claim 6, wherein the desired impedance is about
2 50 ohms.

1 8. The antenna according to claim 6, wherein the desired impedance is from
2 about 50 ohms to about 75 ohms.

1 9. The antenna according to claim 6, wherein the desired impedance is from
2 about 20 ohms to about 300 ohms.

1 10. The antenna according to claim 1, wherein said radiating element is made
2 of an electrically conductive material.

1 11. The antenna according to claim 10, wherein the electrically conductive
2 material is selected from the group consisting of copper, aluminum, stainless
3 steel, bronze and alloys thereof, copper foil on a insulating substrate, aluminum
4 foil on a insulating substrate, gold foil on a insulating substrate, silver plated
5 copper, silver plated copper foil on a insulating substrate, silver foil on a
6 insulating substrate and tin plated copper, graphite impregnated cloth, a graphite
7 coated substrate, a copper plated substrate, a bronze plated substrate and an
8 aluminum plated substrate.

1 12. The antenna according to claim 1, wherein said ground plane is made of
2 an electrically conducting material.

1 13. The antenna according to claim 12, wherein the electrically conductive
2 material is selected from the group consisting of copper, aluminum, stainless
3 steel, bronze and alloys thereof, copper foil on a insulating substrate, aluminum
4 foil on a insulating substrate, gold foil on a insulating substrate, silver plated
5 copper, silver plated copper foil on a insulating substrate, silver foil on a
6 insulating substrate and tin plated copper, graphite impregnated cloth, a graphite
7 coated substrate, a copper plated substrate, a bronze plated substrate and an
8 aluminum plated substrate.

1 14. The antenna according to claim 1, wherein said ground plane is on one
2 side of an insulating substrate and said radiating element is on the other side of
3 the insulating substrate.

1 15. The antenna according to claim 14, wherein said ground plane, the
2 insulating substrate and said radiating element are flexible.

1 16. The antenna according to claim 1, wherein the first area of said ground
2 plane and the second area of said radiating element are rectangular.

1 17. The antenna according to claim 1, wherein the first area of said ground
2 plane and the second area of said radiating element are non-rectangular.

1 18. The antenna according to claim 1, further comprising at least one opening
2 in said radiating element for attachment of at least one mechanical support.

1 19. The antenna according to claim 1, further comprising at least one opening
2 in said ground plane for attachment of at least one mechanical support.

1 20. A planar inverted F antenna, comprising:
2 a ground plane having a first planar surface and a first area;
3 a radiating element having a second planar surface and a second area,
4 wherein the second planar surface of said radiating element being
5 substantially coplanar with the first planar surface of said ground plane;
6 a first connecting line coupled to an edge of said ground plan and to an
7 edge of said radiating element; and
8 a second connecting line coupled to the edge of said radiating element on
9 either side of where the first connecting line is coupled thereto.

1 21. A planar inverted F antenna, comprising:
2 a ground plane having a first planar surface, a first circumference and a
3 first plurality of edges on the first circumference;
4 a radiating element having a second planar surface, a second
5 circumference and a second plurality of edges on the second
6 circumference, the second planar surface of said radiating element being
7 substantially coplanar with the first planar surface of said ground plane;

8 a first connecting line coupled to a first edge of the first plurality of edges
9 and a first edge of the second plurality of edges; and
10 a second connecting line coupled to the first edge of the second plurality
11 of edges on either side of the first connecting line.

1 22. A method of fabricating a wide bandwidth planar inverted F antenna,
2 comprising the steps of:

3 forming a ground plane on a first planar surface;

4 forming a radiating element on a second planar surface, wherein the
5 second planar surface is substantially coplanar with the first planar
6 surface;

7 coupling a first connecting line to a first edge of the ground plane and to a
8 second edge of the radiating element at a first contact location; and
9 coupling a second connecting line to the second edge of the radiating
10 element at second and third contact locations.

1 23. The method according to claim 22, wherein the first contact location is
2 between the second and third contact locations.

1 24. The method according to claim 22, further comprising the step of coupling
2 the second connecting line to the second edge of said radiating element at a
3 plurality of contact locations.

1 25. A radio system having a planar inverted F antenna (PIFA), said system
2 comprising:
3 a ground plane having a first planar surface and a first area;
4 a radiating element having a second planar surface and a second area,
5 wherein the second planar surface of said radiating element is substantially
6 coplanar with the first planar surface of said ground plane;
7 a first connecting line coupled to a first edge of said ground plane and to a
8 second edge of said radiating element at a first contact location; and
9 a second connecting line coupled to the second edge of said radiating
10 element at second and third contact locations, and first and second
11 connecting lines are adapted to couple to a radio at a desired impedance.

1 26. A radio system of claim 25 wherein said radio system is part of a
2 mobile phone system.